

We claim:

1. A polymer composition for display mediums, comprising:  
a co-polymer composite of an alkyl material and a phosphonate material; and  
5 luminescent metal ions dispersed in the composite, wherein the composition can be used  
for displays.

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2. The composition of claim 1, wherein the alkyl material includes:  
alkyl acrylate.
3. The composition of claim 1, wherein the alkyl material includes:  
alkyl methacrylate.
4. The composition of claim 1, wherein the phosphate material includes:  
dialkyl vinylbenzylphosphonate.
5. The composition of claim 1, wherein the phosphate material includes:  
alkyl vinylbenzylphosphonic acid monoester.
- 20 6. The composition of claim 1, wherein the phosphate material includes:  
vinylbenzylphosphonic acid .
7. The composition of claim 1, wherein the composite has a molar ratio of:  
approximately 20% to approximately 95% acrylate material; and  
25 approximately 80 %to approximately 5% phosphate material.
8. The composition of claim 1, wherein the luminescent metal ions include:

rare earth compounds.

9. The composition of claim 1, wherein the luminescent metal ions include:

NaYF<sub>4</sub>:ErYb

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10. The composition of claim 1, wherein the composite is:

phosphorylated polymethyl methacrylate(p-PPMA).

11. The composition of claim 1, wherein the luminescent metal ions include:

rare earth ions co-doped with Yb<sup>3+</sup> in fluoride and orthophosphate crystalline hosts.

12. The composition of claim 11, wherein the doping ion further includes:

Tm.

13. The composition of claim 11, wherein the doping ion further includes:

Er.

14. The composition of claim 11, wherein the doping ion further includes:

Ho.

15. The composition of claim 11, wherein the doping ion further includes:

Nd.

16. The composition of claim 11, wherein the doping ion further includes:

Pr.

17. The composition of claim 11, wherein the doping ion further includes:

Ce.

18. The composition of claim 11, wherein the crystalline hosts include:

NaYF<sub>4</sub>.

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19. The composition of claim 11, wherein the crystalline hosts include:

KYF.

20. The composition of claim 11, wherein the crystalline hosts include:

YLF.

21. The composition of claim 11, wherein the crystalline hosts include:

LuPO<sub>4</sub>.

22. A polymer composition for optical applications, comprising:

a co-polymer composite host of an alkyl material and a phosphonate material; and

luminescent metal ions dispersed in the composite host without cracking and

delamination of the composite host, wherein the composition is used for optical applications.

23. A method of making a polymer composition, comprising the steps of:

forming a co-polymer from an alkyl material and a phosphonate material; and

dispersing luminescent metal ions in the co-polymer without cracking and delaminating

of the co-polymer.

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